Shacktook 1971

Fulman Notes

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Dr. Hildegarde Howard
2045 Q Via Mariposa East
Laguna Hills, California 92653

618
620 } 7. glacials
619

543 P. opisthe

1375 P. pacifica

27 — P. glacialis

557 P. opisthe

— 698 P. creatopus

— 672 7. glacialis?

50 Pogonabrium

555 P. opisthe

How about P. glacialis #15873?

Early Copy as sent to Storrs with question about need to contact other genera (1)

A NEW SPECIES OF FULMAR (AVES: PROCELLARIIDAE) FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA

by Hildegarde Howard

In a recent review of avian fossils from the Sharktooth Hill Bonebed in Kern County, California, a humerus representing a small fulmar-like bird has been noted. Although the Family Procellariidae is well represented in the Miocene of California (including Sharktooth Hill) by specimens referable to the genus Puffinus, thers is only one Tertiary record of a fulmar. Fulmarus hammeri Howard 1968 from the late Miocene, Monterey Formation in Orange County, California, was described from a carpometacarpus, with a fragmented humerus referred. As the small size of the Sharktooth Hill specimenimmediately distinguishes it from the referred specimen of F. hammeri, a new species is herein described.

Fulmarus n. sp.

Holotype.-- Nearly complete left humerus, Natural History Museum of Los Angeles County (LACM) no. 122995, collectedby Howell W. Thomas in 1979.

Locality.-- LACM locality 3162, Sharktooth Hill Bonebed, Kern County, California.

Age of Formation.-- Middle Miocene, Round Mountain Silt, Barstovian Land Mammal Age.

Diagnosis.-- Resembling ~~Fulmarus glacialis~~ Fulmarus but distinguished from the various species of the genus Puffinus by (1) shaft above brachial depression relatively broad laterally and shallow in palmar-anconal dimension; (2) deltoid crest long and having prominent projecting point midway of length; (3) ectepicondylar prominence short and blunt. Distinguished from Fulmarus glacialis ~~(kinnexus)~~ by (1) bicipital crest slightly swollenin palmar aspect, relatively longer and with more clearly defined distal extremity; (2) ectepicondylar prominence less raised above distal end of bone (ratio of height of prominence above distal end to length of bone 919 percent as compared with 11.5 percent in F. glacialis).

Measueement.-- Greatest length 78.2 mm; breadth of distal condyles 7.1 mm; distance from distal end to proximal surface of ectepicondylar prominence 7.8 mm; lateral dimension of shaft above brachial depression 5.4 mm; palmar-anconal dimension of shaft at same place 3.2 mm.

Table of Measurements(in millimeters) of Fulmarus n.sp. and small specimens of Fulmarus glacialis and Puffinus opisthomalæs.

	Fossil	F.glacialis	P. opisthomelas
Length	78.2	98.6	80.5
Proximal breadth	13.1	16.8	14.2
Breadth distal condyles	7.1	8.4	7.3
Greatest breadth distal end	9.4	11.5	8.3
Height ectepicondylar prominence	7.8	11.4	9.4
Breadth of shaft	5.4	6.2	3.1
Depth of shaft	3.2	3.8	5.7
Length of deltoid crest from head.	20.4	25.7	18.1
Length of bicipital crest from head	15.2	17.2	13.3

Discussion.-- The holotype carpometacarpus of Fulmarus hammeri is approximately 20 percent larger than the average of seven Recent specimens of F. glacialis, whereas the holotype humerus here described is more than 20 percent smaller. The one measurement that can be compared with F. hammeri is that of the height of the ectepicondylar prominence above the distal end. In the referred humerusof F. hammeri this measurement is 12.8 mm, as compared with 7.8 mm. in Fulmarus n. sp.

Tableof Measurements (in millimeters)
of Fulmarus n. sp. and small specimens of Fulmarus glacialis
and Puffinus opisthomelas

Measurement	Fossil	F. glacialis	P. opisthomelas
Length	79.2	98.6	80.5
Proximal breadth	13.1	16.8	14.2
Breadth distal condyles	7.1	8.4	7.3
Greatest distal breadth	9.4	11.5	8.3
Height ectepicondylar prominence from distal end	7.8	11.4	9.4
Breadth of shaft	5.4	6.2	3.1
Depth of shaft	3.2	3.8	5.7
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MEASUREMENTS (in millimeters) OF HUMERI OF FOSSIL AND RECENT SPECIES OF FULMARINE BIRDS[a]

	LACM 122995	Fulmarus glacialis	Fulmarus glacialoides	Thalassoica antarctica	Daption capense
Greatest length	78.2	98.6 - 106.7	106.9	96.0	86.7
Proximal breadth[1]	13.0	16.0 - 17.0	18.0	16.9	15.3
Greatest breadth distal end	9.5	11.7 - 12.7	12.7	12.5	10.9
Height of ectepicondylar prominence from distal end	7.8	11.0- 11.7	13.0	12.8	10.8
Length of deltoid crest from head	20.4	24.7 - 27.5	28.2	25.7	22.4
Length of bicipital crest from head	15.2	16.9- 18.4	19.7	18.0	15.7
Breadth of shaft[2]	5.4	6.7 - 6.8	8.0	7.6	6.0
Depth of shaft same place	3.2	3.8 - 4.0	4.8	4.4	3.4

[1] Proximal breadth measured from external tuberosity to below tip of internal tuberosity

[2] Breadth and anconal-palmar depth of shaft measured just above brachial impression

[a] The only measurement available on the referred distal fragment of humerus of Fulmarus hammeri was the height of the ectepicondylar prominence from the distal end -- 13.0 mm.

Fig. 1. LACM 122995. Fulmarus miocenus n. sp. A. Anconal view B. palmar view; C. External view. X approx. 1.

Fig. 1. Holotype humerus (LACM 122995) of Fulmarus miocenus n. sp. Left, Anconal view; right, Palmar view. x apparox. $1\frac{1}{3}$.

CONCLUSION

The new species, Fulmarus miocenus, brings the total number of species described from the Sharktooth Hill Bonebed to nine, and adds a fourth species to the Family Procellariidae named from this locality.

Although the genus Puffinus of the Fmaily Procellariidae are well represented in the Tertiary fossil record, the Sharktooth Hill specimen is only the third record of of the Fulmars, and only the second species to be described. In addition to Fulmarus hammeri from the Miocene of Orange Co., Wetmore (1926) presumably from Maryland, the Miocene Calvert Formation, on the basis of a shaft of humerus said to resemble Fulmarus glacialis in "size and structure." The Maryland specimen was obviously too large to be affiliated with the Sharktooth Hill species.

ACKNOWLEDMENTS

I amparticularly grateful to Storrs Olson of the Natioa nl Museum of Natural History, Smithsonian Institution for arranging the loan of the USNM specimens after reading an early draft of this manuscript.

I amparticularly grateful to Storrs Olson of the National Museum of Natural History, Smithsonian Institution. After reading a preliminary draft of this manuscript and viewing polaroid shots of the specimen he, he arranged the loan of the USNM comparative material. He also refereed the final copy.

Thephotographs were taken by my husband, Henry Anson Wood, and the prints made by LACM photographer Richard Meier.

CONCLUSION

The family Procellariidae is well represented in the Tertiary fossil record by the shearwaters, genus Puffinus. The Sharktooth Hill specimen, Fulmarus miocenus, is, however, only the second species of fulmar to be described, and the third fulmarine record for the Tertiary. In addition to Fulmarus hammeri from the Miocene of Orange County, California, Fulmarus sp. was recorded from the Mioceneof Maryland on the basis of a shaft of humerus said to resemble Fulmarus glacialis in "size and structure." The sizeof the specimen issufficient to indicate that it cannot be attributable to F. miocenus.

The new species, Fulmarus miocenus, brings the total number of avian species described from the Sharktooth Hill Bonebed to nine, and adds a fourth species to the Family Procellariidae named from this locality. The other members of the family are the shearwaters Puffinusinceptor Wetmore 1930, P. priscus Miller 1961n and P. mitchelli Miller 1961.

Although the Family Procellariidae is well represented in the Tertiary fossil record by the genus Puffinus, the Sharktooth Hill specimen, here described, is only the third record of the fulmars, and only the second species to be described. In addition to Fulmarus hammeri from the Miocene of Orange County, California, Fulmarus sp. was recorded (Wetmore 1926) from the Miocene of Maryland on the basis of a shaft of humerus said to resemble Fulmarus glacialis in "size and structuee." The Maryland specimen, ~~therefore~~, therefore, presumably is too large to be attributable to Fulmarus miocenus.

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CONCLUSION

The new species, Fulmarus miocenus, brings the total number of species described from the Sharktooth Hill Bonebed to nine, and adds a fourth species to the Family Procellariidae named from this locality. The others are: Puffinus inceptor Wetmore 1930, Puffinus priscus Miller 1961, and Puffinus mitchelli Miller 1961.

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Although the Family Procellariidae is well represented in the Tertiary fossil record by the genus Puffinus, the Sharktooth Hill specimen, here described is only the second species of fulmar to be described and only the third record of the genus Fulmarus. In addition to Fulmarus hammeri from the Miocene of Orange County, California, Fulmarus sp. was recorded (Wetmore 1926) from the Calvert Formation (Miocen of Maryland (Wetmore 1926), on the basis of a shaft of humerus said to resemble Fulmarus glacialis in "size and structure," The Maryland apscimen was, therefore evidently too large to be attributable to F. miocenus.

Sept. 1, 1983

Or loan to Hildegarde

Humerus L LACM 3161 / 122995 (Shark tooth Hill)
n. sp.

Distal fragment humerus
referred to Fulmarus harrisi
Lacm 1945 / 18263

Humeri of Recent Fulmarus
nos. 618, 619, 620, 27, 672 (one each)

Humeri of Recent Puffinus
- P. griseus #50
- P. opisthomelas #543 and 557? (+ two specimens)
- P. creatopus #698
- P. pacificus #1375

not removed from LACM
- P. griseus 18873 left 118.3 ectipi 11.5
- other Fulmarus glacialis at mus. # 26 & 27 mear. total 7 specimens

HH

Pappeia dysstromelas 11 specimens Recent

min II 543 80,6 length humerus of 11 specimens

~~542~~ ~~84.4~~

~~max 555~~ 84.9

~~557~~ ~~81.6~~

new humeri from the 4950 6688 18140 → 80.4 to mt. condyle br. condyles 8.0

→ 82.3 only complete P. pumilio br condyles 7.6

Fulmarus miocenum n. sp.

Holotype. left humerus LACM # 122995

Collected in 1929 by Howard W. Thomas

Locality LACM 3162. Shahtootski Hill
Broaded, Kern Co. Calif.

Age & formation Middle Miocene
Round Mountain Silt; Barstovian
land mammal age.

Diagnosis: Resembling members of Genus Fulmarus as distinguished from Puffinus in:

(1) Shaft above brachial depression relatively broad laterally and shallow in palmar-ancoal dimension

(2) Condyle of deltoid crest long in proximal projection

(3) Ectepicondylar prominence short and blunt

Distinguished from Fulmarus glacialis

(1) Smaller size + more clearly defined

(2) Relatively longer bicipital crest with clearly defined distal extremity.

(3) Ectepicondylar prominence less raised above distal end of shaft; ratio of length of prominence to length of humerus: 9,920 (11,5 in Fulmarus & Puffinus)

Length of humerus within the size range of this element in its species

Puffinus ↑ Differs from P. opisthomelas and all other species ↑ and resembling members of the genus Fulmarus in

(1) ~~Deltoid~~ crest relatively longer and contour having prominent projection

~~(2) Shaft above brachial depression broader laterally than dorsoventrally from anconeal to palmar side~~

(2) ~~Condyles rounded~~ ~~Shaft rounded~~ Shaft above brachial depression broader in lateral dimension than from anconeal to palmar dimension

(3) Ectepicondylar process short and blunt

Length of humerus 65mm Av

Size ranges of Pappus ajuthamelas.

Differs from P. ajuthamelas and all other members of the genus Pappus, and resembles Talmarus glacialis in (1) deltoid crest relatively longer and contour having a prominent projection forming (2) shaft above brachial depression broader in lateral dimension than in anconal/palmar dimension (3) Entepicondylar process short and blunt (4) longer bicipital crest

Distinguished from T. glacialis

(A) Bicipital crest slightly swollen in palmar aspect and distal termination more clearly marked.

(B) Entepicondylar process relatively less raised above distal end

brachialis depression
4.9 × 2.8 = 57 ⌀
7.1 × 4.3 = 55 ⌀ = ⌀ 618
7.6 × 3.8 = 48, 79. #620

distance from distal end of trochlea brachialis impression
#618 = 12,7
620 13.7

Tubinaus micrenum

Measurements:		n. sp.	6.8 Tubinaus P. opuntia 56 &
Greatest length (from middle of trochlea to trochlea)	—	78,2	98.4 82.5
Prox br. from ext to intr. tuberosity	—	13.1	16.8 14.4
Distance from head to distal end bicipital crest	—	15.2	17.2 13.2
Gr. breadth distal end	—	9,4	11.5 8.5
Breadth distal condyles	—	7,1	8.4 7.3
Distance from distal end to proximal surface of ectepicondylar process,	—	7,8	11,4 9,7
	% of Length	9,9%	11,5 11.5%
Breadth shaft (lateral)	—	5.4	4.2 3,2
Depth shaft palmar to dorsal	% 148,7	3,2	16.3% 3,8 5,7 5,14
Distance from head to distal end of deltoid crest	—	20.7	25.7 19,3
Radius length bicipital crest to length bone		19,4%	17.4 16,0%
Radius length to deltoid to length bone		26.4	26,06 25,7

opuntia 23,34 grisea 23,0 cuniculus 22,07 varians 21,6 gracilis 21,84

Relative length gradients inferior to deltoid crest

77.1 67,2

* Distance from distal end to prox surface ectepi process in T. hemmeri referred is 12.8 mm

† gracilis 10,6–11.4 average 11.1

Fulmarus miocenum n sp.

Holotype nearly complete left humerus LACM

Collected by Howell Thomas 1979

Loc. 3162

Diagnosis; Length 78.1 mm, br dist condyle 7.2 dist-ect-ent condylar prominence 7.7.

(same meas in smaller Puffinus opisthomelas = length 72.4, br. condyle 7.4 dist-ect 9.1

br x depth shaft

90	5.4	3.1	pr. sh.
57.9%			
172%	2.9	5.0	Puf.

Length within the range of P. opisthomelas

Fulmarus #618 length 98.7 br/depth sh 6.75 x 3.9

ratio ect-ent to length distally

Fulmarus 11.24 20 br dist 8.9 57 90

fossil 9.85 condyle

Puf. opisth 11.75 ect-ent 11.1

Size of Fulmarus glacialis (Smallest pigmy fossil for Atlantic subspp.)

Length 17 - 20, wing 12 - 13.5, bill 1.5 + tarsus 2.0

Size of F. glacialis minor wing 12, bill 1.35, tarsus 1.75

Size of Daption capense length 15, wing 11 bill 1.33, tarsus 1.67

humerus (ratio of height of prominence above distal end to breadth of distal end 82 per cent, as compared with 92-95 percent in F. glacialis and 102 percent in F. glacialoides). Distinguished from humerus of Miocene species, F. hammeri, by smaller size (height of ectepicondylar prominence above distal end of numerus 7.8 mm, depth of external condyle 5.8 mm; same measurements in the humerus of F. hammeri 13.0 and 9.1 respectively).

Measurements.-- See Table 1.

Discussion.-- The Maryland record of Fulmarus sp. (Wetmore 1926) is based on a fragment of the shaft of a humerus (USNM 237160) between the nutrient foramen and the lower half of the pectoral scar. It was placed in the genus Fulmarus on the basis of the high elevation of the nutrient foramen and general similarity and size with respect to the humerus of F. glacialis. The size alone, therefore, would preclude referral to F. miocaenus. Furthermore, according to Storrs Olson of USNM, who examined the fragment for me, the specimen preserves no diagnostic features that could be used in comparison with the holotype of F. miocaenus, and should probably now be classified only as "Procellariidae, gen. and sp. indet."

there are only two Tertiary records of the genus, both of Miocene age: Fulmarus sp. from Maryland (Wetmore, 1926) and F. hammeri from California. The Maryland record is based on a fragment of the shaft of a humerus (USNM 237160) between the nutrient foramen and the lower half of the pectoral scar. It was placed in the genus Fulmarus on the basis of the high elevation of the nutrient foramen and the general similarity and size with respect to the humerus of F. glacialis. The size would preclude similarity with the fossil specimen now at hand. F. hammeri was described from the proximal end of a carpometacarpus, with the distal fragment of the external side of a humerus referred. The size of the latter immediately distinguishes it from the Sharktooth Hill humerus.

ACRONYMS USED

LACM -- Natural History Museum of Los Angeles County

USNM -- National Museum of Natural History, Smithsonian Institution

COMPARATIVE MATERIAL AVAILABLE

In addition to the single fossil humeral fragment referred to Fulmarus hammeri (LACM no. 18263), humeri of the following Recent species of Procellariidae were available for comparison with the Sharktooth Hill specimen: Fulmarus glacialis rodgersi (7), F. glacialoides (2), Thalassoica antarctica (1), Daption capense (2), Pagodroma nivea (1), Pterodroma phaeopygia (1), Pterodroma lessoni (1), Halobaena caerulea (2), Pachyptila vittata (2), Puffinus creatopus (2), P. griseus (2), P. pacificus (1), P. opisthomelas (11). All specimens of Fulmarus glacialis, one each of F. glacialoides, Daption capense, Halobaena caerulea, Pterodroma lessoni, Pachyptila vittata and all of the several species of Puffinus are from the LACM collections; the other Recent material was loaned by USNM.

humerus (ratio of height of prominence above distal end of humerus to breadth of distal end 82 percent, as compared to 92-95 percent in F. glacialis and 102 percent in F. glacialoides). Distinguished from humerus of Miocene species, F. hammeri, by smaller size (height ectepicondylar prominence above distal end of humerus 7.8 mm, as compared to 13.0 mm in F. hammeri).

According to Storrs Olson of USNM, who has examined the Maryland Fulmaras sp. for me, the specimen preserves no diagnostic features that could be used in comparison with the Sharktooth Hill specimen.

Measurements.-- See Table 1.

According toe Storrs Olson of USNM, who has examined USNM humeral fragment no. 237160 assigned to Fulmarus sp by Wetmore (1926) the specimen preserved no disgnostic features that could be used in comparison with the Sharktooth Hill specimen

According to Storrs Olson of USNM, who examined the humeral fragment fragment fro the Miocene of Maryland for me, the specimen preserves no diagnostic features that could be used in comparison with the Sharktooth Hill specimen, and, in fact c

Discussion.-- The Maryland record of Ulmarus sp (Wetmore 1926) is based on a fragment of the shaft of a humerus (USNM 237160) between the nutrient foramen and the lower half of the pectoral scar. It was placed in the genus Fulmaruson the basis of the high elevation of the nutrient foramen and general similarity and size with respect to the humerus of F. glacialis. The size alone would preclude similarity with the holotype of F. miocaenus. Furthermore, according to Storrs Olson of USNM, who examined the fragment for me the specimen preserves no diagnostic features that should be used in comparison with the holotype of F. miocaenus, and probably now be classified only as"Procellariidae, gen. and sp. indet."

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Although the Family Procellariidae is well represented in the Tertiary fossil record by the genus Puffinus, the Sharktooth Hill specimen, here described, is the only the third record of the fulmars, and only the second species to be described. In addition to Fulmarus hammeri from the Miocene of Orange County, California, the genus was recorded (Wetmore 1926) from the Miocene of Maryland (as Fulmarus sp.) on the basis of a shaft of humerus said to resemble Fulmarus glacialis in "size and structure." The Maryland specimen is, therefore, evidently too large to be attributable to Fulmarus miocenus.

ACKNOWLEDGMENTS

I am particularly grateful to Storrs L. Olson of the National Museum of Natural History, Smithsonian Institution, for selecting and arranging the loan of the USNM Recent skeletons after reading an early draft of this manuscript.

My thanks also to to my husband, Henry Anson Wylde, for his painstaking care in photographing this fragile specimen, and to Richard Meier, LACM Photographer, for preparing the excellent prints.

A shaft of humerus was recorded (Wetmore 1926) from the Miocene of Maryland as Fulmarus sp. and said to resemble F. glacialis in size Storrs Olson, who has kindly examined the specimen for me, notes that the specimen is too poorey preserved

Dear Storrs:

Thank you so much for yur letter of March 29. With your permission I will make the following statement in my paper.

Although bones of the living Fulmarus glacialis are recorded from the Pleistocene (Brodkorb 1963, p. 245) and two of these are from California, there are only two Tertiary recorded of the genus ~~Fulmarus~~ Fulmarus sp. from the Miocene of Maryland (Wetmore, 1926) and F. hammeri from the Monterey Formation (late Miocene) of Orange County, California. The Maryland specimen is a poorly preserved shaft of humerus including only the distalmost portion of the pectoral scar, that Wetmore noted agreed in "size and structure" with the living F. glacialis. It is, therefore, too large to be attributable to the species represented here, a judgment with which Storrs Olson, who has examined the ~~xx~~ worn fragment for me agrees.

The breadth of the shaft immediately below the pectoral scar in F. miocaenus is 5.2, depth same place 4.0.

I gather you do not agree with Wetmore's distinction of Fulmarus from P~~,~~ffinus in the basis of the higher elemation on the shaft of the nutritive foramen

TING LING LEARNS ABOUT WRITING STORIES

1 I have nice teacher. She tells me how to write stories in English. First, she say, you decide on subject. I will write about the class.

2 She says story must start with conversation, like "Good morning, Mrs. Fitch, I have come to learn how to write story."

3 Now story must described characters . So I write about man with gray whiskers who write naughty story. And lady with sweet smile who can't hear what teacher say sometimes, and others who have been in class long time and call teacher "Eileen."

4 Teacher say story must have hero (or heroess), but she call them "Pro" and "Aunty" somebody. And there must be conflict in story.

5 I don't like conflict. Very bad to fight with people. So I tell teacher, I won't write conflict in my story.

6 She say, I must have conflict or I cannot pass dlass.

7 So I don't go to class any more. Feel very sad.

8 Then teacher call me on telephone. She say,"Why don't you come to class?"

9 I say, "I cannot write about conflict and you say I cannot pass if I do not, so I drop class."

10 She say, "You cause trouble for me if you drop out of class. School will think I am bad teacher."

11 I feel very bad.

12 She ask if I have been writing since I left the class.

I say,"Only in my diary."

She say, Come to class once more, and bring your diary."

13 So I go to class today and show teacher my diary.

She make big check mark on my diary page, and say, "That is conflict."

14 So I guess I am "aunty" and will pass.

#24 102.3 #27 103.3

→ 7. glacies

	7. glacies		Pachyphilla 55.4	glaviolis 106.9	parodeum 67.8	Halobeum 63.3	Azeil 78.2	4 hamail	tharsonia	Daphon
qu length to vist condyle	106.7	98.6	58.6					#18263	96.0	86.7
post b. tub. below tip of vist to ext. tub.	17.0	16.0	10.9	18.0	13.4	11.7	13.0		17.0	15.3
8. br. dist	12.7	11.7	8.1	12.7	9.2	9.1	9.5		12.5	10.9
ht ectepic. prom. from ectocond.	11.7	11.0	8.0	13.0	9.7	9.7	7.8	13.0	12.8	10.8
bicip crest to head	18.4	16.9	10.9	19.7	12.8	12.4	11.2		18.0	15.7
shaft chme fractional expans diffr to	6.8 14.3 17.2	6.7 12.6 4.0		14.8 x 12.6 8.0 10.648			3.7 3.4		4.4 7.6	3.7 6.0
ratio ect tub dist	98.9 - 94.8%		98.7	102.3	105.4%	106.5%	82%		102.4%	99%

11.4 x 12.4
91.9

11.0 x 11.4
94.8

11.7 x 12.4
94.3

11.1 x 12.1
91.7

11.7 x 12.7
92.1

ratio length 620
bicip cr. to 17.2%
length bone 618 17.1%

102.2 27 17.8%
672 16.6
619 17.2%

18.6 18.4 18.8 19.1 19.4 18.7 18.1

Other genera in which the deltoid crest has the prominent hooklike point

The prominent, hooklike pi

The prominently projecting deltoid crest with hooklike point is also present in members of the genus Pterodroma. P. phaeopygia. The one species of this genus available for comparison resembles the shearwaters however, in the long, pointed ectepicondylar prominence and deeper olecranoal fossa. caerulea Other petrels, such as Pagodroma nivea, Halobaena and Pachyptila vittata, though having a more pointed deltoid crest than in the shearwaters, the point lacks the hooklike quality found in the fossil. The Pagodroma and species is further distinguished by the depression below the head. In Halobaena caerulea the pectoral attachment is also slightly depressed in this area and is is longer and more

Other petrels, such as Pagodroma nivea, Halobaena caerulea and Pachyptila vitta, though having a more pointed deltoid crest than in the seharwaters, lack the hooklie quality of the point. The Pagodroma species is further distinguished from the fossil by the depression below the head. In Pachyptila vitta the bicipital crest is shorter, and in Halobaena caerulea, the pectoral attachment is longer and narrower and the ectepicondylar prominence is wider.

A NEW SPECIES OF FULMAR (AVES:PROCELLARIIDAE) FROM THE SHARKTOOTH HILLS BONEBED

Hildegarde Howard

In a recent review of avian fossils presented to the Natural History Museum of Los Angeles County by Howell Thomas a specimen representing a small Fulmar was noted. This occurrence is of especial significance as the genus Fulmarus has only one previous Tertiary record, F. hammeri Howard 1968 from the late Miocene, Monterey Formation, in Orange County, California. As the small size of the Sharktooth Hill specimen immediately distinguishes it from the referred humeral fragment of F. hammeri, a new species of Fulmar is herein described.

Fulmarus miocenum n.sp.

Holotype.-- Nearly complete left humerus, Natural History Museum of Los Angeles County (LACM) no. 122995 collected by Howell W. Thomas in 1979.

LOCALITY.-- LACM localitiy 3162, Sharktooth Hill Bonebed, Kern County, California.

Age of Formation: Middle Miocene, Ronund Moujtain Silt, Barstovian Land Mammal Age.

Diagnosis: Resembling members of the genus Fulmarus, as distinguishe from those of the gehus Puffinus in (1.) Shaft above brachial depressin relatively broad laterally and shallow in palmar-anconal dimension; (2.) Deltoid crest long and having a prominent projecting pint; (3.) ectepicondylat prominence short ang blunt. Distinguished from Fulmarus glacialis (Linnaeus) by 1 bicipital crest relatively longer and with more clearly defined distal extremity; 2; ectepicondylar prominence less raised above distal end of bone (ratio of height of prominence to breadth of distal 3nd 9.9% as comapred with 11.5 % in F. glacialis.)

Diagnosis: Length of humerus within the size range of Puffinus opisthomelas, but differeing from that species ~~and~~ (as well as ~~all~~ other species of the genus Puffinus) and resembling Fulmarus glacialis in: (1) deltoid crest relatively longer and contour ~~having a~~ with prominent projecting point about midway of length; shaft above brachial depression broader in lateral dimension than in anconal-palmar dimension; ectepicongylar bicipital crest ~~xxxxxxx~~relatively longer prominence short and blunt; Distinguished from F. glacialis in bicipital crest slightly swollen in palmr aspect and distal termination more clearly marked; ectepicondylar process reltviely less raised above distal end

Measurements: Greatest length 78.1 mm; breadth of distal condyles distance from ~~xxxxxxxxx~~ distal end to proximal surface of 7.2 mm, ~~xxxxxxxxx~~ectepicondylar prominence ~~xxxxxxxxxxxxx~~ 7.8 mm. lateral dimension of shaft above brachial depression ~~xxx~~ 5.4; palmar-anconal dimension of shaft same plave 3.2 mm.

	Fossil	smallest F.glac.	P. opistho
Length	78. 2	98.6	82.5
Prs. br. exto intub.	13.1	16.8	14.4
Head to dist.end bicip. cr.	15.2	17.2	13.2
Gr.Br. dist.	9.4	11.5	8.5
Br. dist.conds.	7.1	8.4	7.3
Hr. ect. pro,	7.8	11.4	9.7
Br. sh (lat.) above brach im	5.4	6.2	3.2
Depth sh	3.2	3.8	5.7
Length deltoid from head	20.7	25.7	19.3

Measurements ~~xxxxxxxxxx~~ 568

Distinguished from F. hammeri by smaller size. F. Hammeri is The holotype carpometacarpus of F. hammeri is approximately 20 per cent larger than the average of 7 Recent specimens of F. glacialis; whereas the holotype humerus ~~xxxx~~ here described is more than 20 per cent smaller. The one measurement that can be compared with F. hammeri is that of the ht of the ectepicondylar prominence which in the referred humerus of F. hammeri is 12.8 mm. a scomppared with 7.8 mm. in F. miocenum

Among the fossil birds collected from the Sharktooth Hill Bonebed collected and donated to the Nat. Hist. Mus. of Los Angeles Co. by Howard W. Thomas (1)

A NEW SPECIES OF FULMAR FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA (AVES:PROCELLARIIDAE)

By Hildegarde Howard

Among the avian fossils collected in 1979 from the Middle Miocene Sharktooth Hill Bonebed in Kern County, California, was collected & donated to LACM by Howard W. Thomas a small, fragmentary humerus suggesting relationship to the Procellariidae, a family which includes the fulmars, petrels and shearwaters. This is well represented in the Bonebed by three species of shearwaters, genus Puffinus. After expert preparation of the fragile humerus, it becomes evident that the specimen represents a species more closely allied to the fulmars than to the shearwaters.

There is only one Tertiary fulmarine record for California, Fulmarus hammeri Howard 1968, described from the Monterey Formation (late Miocene) of Orange County. The holotype is a proximal end of carpometacarpus, with a distal fragment of humerus referred. The small size of the Sharktooth Hill specimen immediately distinguishes it from the referred humerus of F. hammeri.

ACRONYMS USED

LACM -- Natural History Museum of Los Angeles County

USNM -- National Museum of Natural History, Smithsonian Institution

COMPARATIVE MATERIAL

In addition to the single fossil humeral fragment referred to Fulmarus hammeri (LACM no. 18263), humeri of the following Recent species of Procellariidae were available for comparison with the Sharktooth Hill specimen: Fulmarus glacialis rodgersi (7), F. glacialoides (1), Thalassoica antarctica (1), Daption capense (1), Pagodroma nivea (1), Pterodroma phaeopygia (1), Halobaena

caerulea (1), Pachyptila vittata (1), Puffinus creatopus (2), P. pacificus (1), P. griseus (2), and P. opisthomelas (11). All specimens of Fulmarus glacialis and of the several species of Puffinus are from the LACM collections, theother Recent material is from USNM.

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by the deltoid crest having a prominent, projecting, hooklike point, ~~the deltoid crest having a~~ longer bicipital crest ~~which is~~ clearly delimited distally, the ectepicondylar prominence short and blunt, ~~the olecranal fossa shallow~~, and the shaft above the brachial depression broad laterally and shallow in palmar-anconal dimension.

In these characters resemblance is closest to the humerus ~~of~~ the fulmars, Fulmarus glacialis, F. glacialoides and Thalassioca antarctica, and the petrel, Daption capense. Thalassioca and Daption, however, have a marked depression of the shaft immediately below the head of the humerus which is not present in the two Recent species of Fulmarus or in the fossil. Also in Daption the point of the deltoid crest is less sharply hooked.

The promimently projecting deltoid crest with hooklike point is also present in members of the genus Pterodroma. P. phaeopygia, the one species of this genus available for comparison, resembles the shearwaters, however, in the long, pointed ectepicondylar prominence and ~~deeper olecranal fossa~~. Other petrel, such as P Pagodroma nivea, Halobaena caerulea and Pachyptila vittata, although having a more pointed deltoid crest than in the shearwaters, lack the hooklike quality of the point. The Pagodroma humerus is further distinguished from the fossil by the depression of the shaft below the head.

In Pachyptila vittata the bicipital crest is short as in Puffinus, and in Halobaena caerulea the pectoral attachment is longer and narrower than in the fossil humerus, and the ectepicondylar prominence is wider.

Although the characters of the Sharktooth Hill humerus most closely resemble those found in Fulmarus, the differences noted are more marked than those that distinguish the two Recent species of that genus. In view of the similarities noted in the humeri of Thallassioca and Daption to that of Fulmarus, it is possible that a distinct, perhaps ancestral, genus is represented by this Miocene bone. ~~In view of~~ With the limited knowledge now at hand, however, it is considered advisable to record this single specimen under the genus Fulmarus as a new species.

Fulmarus miocenus n. sp.

Holotype.-- Nearly complete left humerus, Natural History Museum of Los Angeles County no. 122995, collected by Howell W. Thomas in 1979.

Locality.--LACM locality 3162, Sharktooth Hill Bonebed, Kern County, California.

Formation and age.--Round Mountain Silt, Middle Miocene, Barstovian Land Mammal Age.

Diagnosis.--Distinguished from Fulmarus glacialis and F. glacialoides by small size (see table 1) and the following structural characters: the humerus of shaft, anconally, below head less acutely angular, with capital shaft ridge more median in position and less proximal in extent; bicipital crest relatively longer, with contour more evenly rounded, and, viewed from palmar side, distal termination more clearly marked and bicipital surface more swollen; ectepicondylar prominence less raised above distal condyles (ratio of height of prominence above distal end to breadth of distal end 82 % as compared to 92-95% in F. glacialis and 102 % in F. glacialoides). Distinguished from Fulmarus hammeri humerus of Miocene species by smaller size (height of ectepicondylar prominence 7.8 mm above distal end as compared to 13.0 mm in F. hammeri).

Measurements.-- see Table 1.

F miocenus - 2 shots

Photos F glacialoides 491469 } 2 shots
F glacialis 672

Pteradroma 502506 }
Puffinus opisthomelas 543 }
P. griseus 50 }
P. creatopus 698 }
Thalassoica 489516 } 4 shots
Daption 489493

A NEW SPECIES OF FULMAR (AVES: PROCELLARIIDAE) FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA

By Hildegarde Howard

In a recent review of avian fossils from the Sharktooth Hill Bonebed in Kern County, California, a humerus representing a small fulmar-like bird has been noted. Although the Family Procellariidae is well represented in the Miocene of Califonrnia (including Sharktooth Hill) by specimens referable to the genus Puffinus, there is only one Tertiary fulmarine record. Fulmarus hammeri Howard 1968 from the late Miocene, Monterey Formation of Orange County, California, was described from a carpometacarpus, with a fragmented humerus referred. As the small size of the Sharktooth Hill specimen immediately distinguishes it from the referred specimen of F. hammeri, a new species is herein described.

Compared with the humerus of Recent procellariids, the Miocene specimen most closely resembles those of the genus Fulmarus (including the Thalassoica and Daption. clsely related Slender-billed Fulmar Thalassoica antarctica) and the Cape Petrel, The greatest number of characters, however, agree with those found in Fulmarus glacialis and F. glacialoides. The new species is, therefore placed in the genus Fulmarus.

Fulmarus miocenus n. sp.

Holotype.--Nearly complete left humerus, Natural History Museum of Los Angeles County (LACM) no. 122995, collected by Howell W. Thomas in 1979.

Locality.-- LACM locality 3162, Sharktooth Hill Bonebed, Kern County, California.

Formation and Age.--
Age of Formation Round Mountain Silt, Middle Miocene, Barstovian Land Mammal Age.

Diagnosis.--Resembling the humerus of Fulmarus glacialis and F. glacioloides as distinguished from that of the various species of the genus Puffinus by (1) Deltoid crest having prominent projecting point; (2) ectepicondylar prominence short and blunt; shaft above brachial depression broad laterally and shallow in palmar-anconal dimension; (4) bicipital crest longer and with distal border more clearly defined. Distinguished from the humerus of Thalassoica antarctica and Daption capense (which are othersise similar to that of Fulmarus) in absence of deep depression below and undercutting the head anconally.

Distinguished from both species of Fulmarus by more evenly rounded contour of bicipital crest with smaller bicipital surface; capital shaft ridge more nearly median in position; ectepicondylar prominence less raised above distal end and generally smaller size.

caerulea (1), Pachyptila vittata (1), Puffinus creatopus (2), P. pacificus (1), P. griseus (2), and P. opisthomelas (11). All specimens of Fulmarus glacialis and of the several species of Puffinus are from the LACM collections, the other Recent material is from USNM.

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by the prominently projecting, hooklike, point of the deltoid crest, longer bicipital crest more clearly delimited distally, ectepicondylar prominence short and blunt, shaft above brachial depression broad laterally and shallow in palmar anconal dimension, olecranal fossa small.

In these characters resemblance is closest to the humerus in Fulmarus glacialis, F. glacialoides, Thalassioca antarctia and Daption capense. T. antarctica and Daption capense, however, have a marked depression below the head which is not present in Fulmarus or in the fossil at hand. This depression is also observed in the humerus of Pagodroma nivea, and Halobaena caerulea, and Pachyptila vittata. These latter species also have a narrower, deeper olecranal fossa than in LACM 122995, and P. vittata isfurther distinguished by having a shorter, less distally defined bicipital crest.

brachial depression broad laterally and shallow in palmar-anconal dimension.

In these characters resemblance is closest to the humerus in Fulmarus glacialis, F. glacialoides, Thalassioca antarctica and Daption capense. T. antarctica and D. capense, however, have a marked depression below the head of the humerus which is not present in Fulmarus or in the fossil at hand.

In the representatives of the other fulmarine genera examined, the humeri of Pagodroma nivea and Halobaena caerulea are distinguished from the fossil by the depression below the head. Furthermore, in Halobaena the ectepicondylar prominence is much wider. The humerus of Pachyptila vittata, slso is slightly excavated below the head, and the bicipital crest is shorter. The humerus of Pterodroma phaeopygia, has the prominently projecting deltoid crest, but distally, the shaft more closely resembles that of Puffinus creatopus, and the ectipicondylar prominence is long and pointed as in the shearwaters.

Fulmarus

Holotype.-- Nearly complete left humerus, Natural History Museum of Los Angeles County (LACM) no. 122995, colected by Howell W. Thomas in 1979.

Locality.-- LACM locality 3162, Sharktooth Hill Boneved Kern County, California.

Formation and Age.-- Round Mountain Silt, Middle Miocene, Barstovian Land Mammal Age.

F. glacialoides

Diagnosis.as Distinguished from the humerus in the several species of shearwaters (genus Puffinus) by: deltoid crest having a prominent projecting point; bicipital crest longer and clearly delimited distally; ectepicondylar prominence short and blunt; shaft above brachial depression broad laterally and shallow in palmar-anconal dimension. Distinguished from the humerus of the Slender-billed Fulmar, Thalassoica antarctica and the Cape Petrel, Daption capense, in absence of depression below the head anconally. Angularity of shaft anconally below head, less marked, less proximal in extent and more medidan in position than in the species of Fulmarus, Thalassoica and Daption

Distinguished from Fulmarus glacialis and F. glacialoides by angularity of the shaft below head, less marked, less proximal in extent and more median in position; bicipital crest more evenly rounded in contour and with more clearly defined distal extremity and; ectepicondylar prominence less raised above distal condyles slightly swollen in palmar aspect.

CONCLUSION

The new species, Fulmarus miocenus, brings the total number of species described from the Sharktooth Hill Bonebed to nine, and adds a fourth species to the Family Procellariidae named from this locality.

ACKNOWLEDGMENTS

I amparticularly grateful to Storrs Olson of the National Museum of Natural History, Smithsonian Institution for arranging the loan of the USNM specimens after reading an early draft of this manuscript.

Diagnosis.-- As described above, deltoid crest with prominent hooklike point as in Fulmarus glacialis and G. glacialoides, but shaft less acutely raised below head, with capital shaft ridge more median in position and less proximal in extent./ Contour of bicipital crest more evely rounded and bicipital surface more swollen. Ectepicondylar prokinence less raised above distal condyles (ratio of height of prominence above distal end to breadth of distal end 9.9 pr cent as compared to 12 to 30 percent in Fulmarus glacialis and 30 percent in F. glacialoides..

A NEW SPECIES OF FULMAR (AVES:PROCELLARIIDAE) FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA

By Hildegarde Howard

Among the avian fossils collected in 1979 from the middle Miocene Sharktooth Hill Bonebed in Kern County, California, was a small, fragmentary humerus suggesting relationship to the Procellariidae, a family that includes the fulmars, petrels and shearwaters. This family is well represented in the Bonebed by three species of shearwaters, genus Puffinus. After expert preparation of the fragile humerus, it becomes evident that the specimen represents a species more closely allied to the fulmars than to the shearwaters.

There is only one Tertiary fulmarine record for California, Fulmarus hammeri Howard 1968. This species was described from the Monterey Formation (late Miocene) of Orange County, California. The holotype is a proximal end of carpometacarpus, with a distal fragment of humerus referred. The small size of the Sharktooth Hill specimen immediately distinguishes it from the referred humerus of F. hammeri. It is, therefore, here described as a new species.

ACRONYMS USED

LACM -- Natural History Museum of Los Angeles County

USNM -- National Museum of Natural History, Smithsonian Institution

MATERIAL

In addition to the single fossil humerus referred to Fulmarus hammeri (LACM no. 18263), humeri of the following Recent species

A NEW SPECIES OF FULMAR (AVES: PROCELLARIIDAE) FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA

By Hildegarde Howard

collected in 1979

Among the ~~xpxexixmexns~~ avian fossils/from the Miocene Shark-
samll,
tooth Hill Bonebed, in Kern County, California, ~~was~~ a/fragmentary
of a fulmar-like bird
humerus. ~~Afxexxxaxxexfuxxxexpaixxxx

Amont the avian fossils collected in 1979 from the Miocene Sharktooth Hill Bonebed in Kern County, California, was a small, fragmentary humerus suggesting relationship to the Procellariidae (fulmars, petrels and shearwaters). This family is well represented in the Bonebed by three species of shearwaters, genus Puffinus. After expert preparation of the fragile humerus, it becomes evident that it represents a species more closely allied to the fulmars than to the shearwaters.

There is only one Tertiary fulmarine record for California, Fulmarus hammeri Howard 1968. This species was described from the Monterey Formation (late Miocene) of Orange County, California. The holotype is a proximal end of carpometacarpus, with a distal fragment of humerus is referred. The small size of the Sharktooth Hill specimen immediately distinguished it from the referred humerus of F. hammeri. It is, therefore, here described as a new species.

Compared with the humerus of Recent procellariids, the Sharktooth Hill bone most closely resembles this element found in members of the genera Fulmarus, Daption and Thalassoica. The greatest number of characters, however, agree with those found in Fulmarus galcialis and F. glacialoides. It is entirely possible that a distinct species is represented. In view of the limited knowledge afforded by this single element, it is considered advisable to record it under the genus Fulmarus.

Comparative Material Available
LACM

In addition to the single fossil specimen of Fulmarus hammeri humeri of LACM 1945/18263 -/ the following Recent species of Procellariidae were available:

Puffinus opisthomelas (8), Puffinus griseus (2), P. creatopus (2), P. pacificus (1); Fulmarus glaacialis (5?), F. glacialoides (1); Daption capejse (1), Thalassoica antarctica (1); (1); Pterodroma phaeopygia (1); Halobaena caerulea (1); Pachyptila vittata (1); Pagodroma nivea (1). /All specimens of Puffinus and of Fulmarus glacialis are freom the collections of the Naturla History Museum of Los Angeles County (LACM); The other materal was kindly loaned by the national Museum of Natural History, Smithsonian Institution (USNM)

Comparative Material Available

In addition to the single fossil specimen of Fulmarus hammeri

Comparative Magerial Available

In addition to the single fossil humerus referred to Fulmarus hammeri, humeri of the following Recent species of Procellariidae were available for this study: Puffinus opisthomelas (8); P. griseus (2), P. creatopus (2), P. pacificua (1), Fulmarus glacialis (5?), F. glacialoides (1), Daption capense (1), Thalassoica antarctica (1), Pterodroma phaeopygia (1), Halobaena caerulea (1), Pachyptila vittata (1); pagodroma nivea (1). The fossil humerus of Fulmarus hammeri and all specimens of Puffinus and Fulmarus glacialis are from the collections of the Natural History Museum of Loa Angeles County (LACM); the other Recent specimens are from the National Museum of Natural History, Smithsonian (USNM).

Description—

of Procellariidae were available for this study: Fulmarus glacialis (4), F. glacialoides (1), Thalassoica antarctica (1), Daption capense (1), Pagodroma nivea (1), Pterodroma phaeopygia, Halobaena caerules (1), Pachyptila vittata (1), Puffinus creatopus (2), P. pacificus (1), P. griseus (2), P. tenuirostris ( ), and P. opisthomelas (8). All specimens of Fulmarus glacialis and of the several species of Puffinus are from the LACM collections, the other Recent material was loaned by the USNM.

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by deltoid crest having prominent projecting hooklike point, bicipital crest longer and clearly delimited distally, ectepicondylar prominence short and blunt, olecranal fossa small, shaft above brachial depression broad laterally and shallow in palmar-anconal dimension.

In these characters resemblance is closest to the humerus in Fulmarus glacialis, F. glacialoides, Thalassioca antarctica and Daption capense. Thalassioca antarctica and Daption capense, however, have a marked depression below the head of the humerus which is not present in Fulmarus or in the fossil now at hand. The humerus of Pterodroma phaeopygis has the prominent projecting deltoid crest, but distally, the shaft more closely resembles that of Puffinus creatopus and the more sharply defined deeper olecranal fossa ectepicondylar prominence is long and poionted as in the shearwaters.

noted in the above list, the shearwaters (genus Puffinus) are well represented. After expert preparation of the fragile humerus, it became evident that the specimen represents a species more closely allied to the fulmars than to the shearwaters.

There is only one Tertiary fulmarine record for California, Fulmarus hammeri Howard 1968. This species was described from the Monterey Formation (late Miocene) of Orange County, California. The holotypee is a proximal end of carpometacarpus, with a distal fragment of humerus referred. The small size of the Sharktooth Hill specimen immediately distinguishes it from the referred humerus of F. hammeri. It is, therefore, here described as a new species.

MATERIAL

In addition to the single fossil humerus referred to Fulmarus hammeri (LACM nol 18263), humeri of the following Recent species of Procellariidae were available for this study: Fulmarus glacialis (6), F. glacialoides (1), Thalassoica antarctica (1), Daption capensi (1), Pagodroma nivea (1), Pterodroma phaeopygia (1), Halobaena caerulea (1), Pachyptila vittata (1), Puffinus creatopus (2), P, pacificus (1),P. griseus (2), P. tenuirostris ( ), and P. opisthomelas (9). All specimens of Fulmarus glacialis and of the several species of Puffinus are from the LACM collections, the other Recent material is from the National Museum of Natural History, Smithsonian (USNM).

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by the deltoid crest having a prominent, projecting, hooklike point, bicipital crest longer and clearly delimited distally, ectepicondylar prominence short and blunt, olecranal fossa small, shaft above

Of the genera analyzed, the charaxters found in Fulmarus most closely resemble those of the Sharktooth Hill fossil. The differences noted are, however, more marked that those noted between the two species of Recent Fulmars. In view of this fact and the close similarity of Daption and Thallassioca to Fulmarus, it is possible that a distinct genus is represented by this single Miocene bone. In view of the limited knowledge now at hand, however, it is considered advisable to record the specimen under the genus Fulmarus.

Fulmarus miocenus n. sp.

Holotype.--Nearly complete left humerus, Natural History Museum of Los Angeles County no. 122995, collected by Howell W. Thomas in 1979.

Locality.--LACM locality 3162, Sharktooth Hill Bonebed, Kern County, California.

Formation and Age.-- Round Mountain Silt, middle Miocene, Barstovian Land Mammal Age.

Diagnosis.--Deltoid crest with porminent hooklike point as in Fulmarus glacialis and F. glacialoides, but shaft below head less acutely angular, with capital shaft ridge more median in position and less proximal in extent. Bicipital crest longer with rounded, and, viewed from palmar side, distal termination clearly marked and bicipital surface more swollen. Ectepicondylar prominence less raised above distal condyles (ratio of height of prominence above distal end to breadth of distal end 9.0 per cent, as compared to 12-20 per cent in Fulmarus glacialis and 30 per cent in F. glacialoides.

Order of listing Procellariiformes in Morony, Bock and Ferrand AMNH

Diomedeidae

Procellariidae

618,629491469 Macronectes (formerly Ossifraga)
✓ Fulmarus
489516 ✓ Thalassoica Slender-billed Fulmar (T. antarctica)
489493 ✓ Daption - Cape Petrel (D. capense) (recorded in S. Mexico, Calif.)
582506 ✓ Pagodroma nivea Those checked in pencil were sent by Storrs
556902 ✓ Pterodroma phaeopygia (Dark-rumped Petrel)
553246 ✓ Halobaena caerulea (So. Atlantic)
554703 ✓ Pachyptila vittata vittata (New Zealand)
Bulweria
Procellaria
Calonectris
Puffinus

of F. hammeri compared with F. glacialis (n?) + F. glacialoides (1)

Discussion.-- The holotype carpometacarpus of Fulmarus hammeri is approximately 20 percent larger than the average of seven Recent specimens of F. glacialis, whereas the holotype humerus here described is more than 20 percent smaller. The one measurement that can be compared with F. hammeri is that of the height of the ectepicondylar prominence above the distal end. In the referred humerus of F. hammeri this measurement is 12.8 mm, as compared with 7.8 mm. in Fulmarus n. sp.

Table of Measurements (in millimeters)
of Fulmarus n. sp. and small specimens of Fulmarus glacialis and Puffinus opisthomelas

Measurement	Fossil	F. glacialis		P. opisthomelas
Length	78.2	98.6	95.9	80.5
Proximal breadth	13.1	16.8	17.4	14.2
Breadth distal condyles	7.1	8.4	9.3	7.3
Greatest distal breadth	9.4	11.6	12.1	8.3
Height ectepicondylar prominence from distal end	7.8	11.4	13.1	9.4
Breadth of shaft	5.4	6.2	7.6	3.1
Depth of shaft	3.2	3.8	4.3	5.7
Length deltoid crest from head	20.4	25.7	26.2	18.1
Length bicipital crest from head	15.2	17.2	17.3	13.3
	19.4	17.4	18.0	16.5
	26.0	26.0	27.3	22.4

Shearwater taking leave Aug. 25 '83

50 Scary P. griseus

1975 Puffinus Jaeger

1375 P. opisthomelas (Mexico) Phylodrum

690 P. Cora types subgenus

537 P. opisthomelas

543 "

49/69	13.0	106.8	— 12.17%	10.0	— 130%
619	11.6	103.0	— 11.2	— 9.6	— 120
472	11.6	102.25	— 11.34	— 9.3	— 121
618	11.5	98.6	— 11.1	— 9.0	— 122
620	10.8	106.6	— 10.3	— 9.6	— 112
27	11.4	102.6	— 11.1	— 9.5	— 120

both of Miocene age
there are only two Tertiary records of the genus, Fulmarus sp. from the Miocene of

Marylnad (Wetmore 1926) and F. hammeri Howard 1968 from the Miocene

of California. The Maryland specimen is a fragment of the shaft of
USNM 237160 between the nutrient foramen and the lower half
a humerus the of the pectoral scar

. It was placed in the genus Fulmarus rather than

Puffinus an the basis of the high elevation of the nutrient foramen
similrity of
and its general conformation and size to F. glacialis.

The latter factor (size) would
no other characters
preclude similarity with the specimen now at hand. Size, also is the

distinguisheing factor of the species F. hammeri

None of the diagnostic characters of the Sharktooth Hill specimen

are preserved in the Maryland bone.

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one Tertiary fulmarine record for the state: Fulmarus hammeri Howard 1968, described from the Monterey Formation (late Miocene) of Orange County. In the original description of F. hammeri, the proximal end of a carpometacarpus was named as the holotype and a distal fragment of a humerus was referred. The small size of the Sharktooth Hill specimen immediately distinguishes it from the humerus referred to F. hammeri.

ACRONYMS USED

LACM -- Natural History Museum of Los Angeles County

USNM -- National Museum of Natural History, Smithsonian Institution

COMPARATIVE MATERIAL AVAILABLE

In addition to the single fossil humeral fragment referred to Fulmarus hammeri (LACM no. 18263), humeri of the following Recent species of Procellariidae were available for comparison with the Sharktooth Hill specimen: Fulmarus glacialis rodgersi (7), F. glacialoides (2), Thalassoica antarctica (1), Daption capense (2), Pagodroma nivea (1), Pterodroma phaeopygia (1), Pterodroma lessoni (1), Halobaena caerulea (2), Pachyptila vittata (2), Puffinus creatopus (2), P. griseus (2), P. pacificus (1), P. opisthomelas (11). All specimens of Fulmarus glacialis, and one each of F. glacialoides, Daption capense, Halobaena caerulea, Pterodroma lessoni, Pachyptila vittata and all of the several species of Puffinus are from the LACM collections; the other Recent material was loaned by USNM.

(Aves:Procellariidae)

Abstract.--A New Species of fulmar from and additional avian records from the Miocene of Kern County, California by Hildegarde Howard. Bull. Southern California Acad Aci. Fulmarus miocaenus n.sp. is described from a humerus foundin the middle Miocene Round Mountain Silt of the Sharktooth Hill Bonebed, Kern County, California, U.S.A. The specimen represents a smaller species than Fulmarus hammeri, theonly other Tertiary fulmar recorded from California. It is also smaller than the humeri of Recent species of fulmars and is further distingusined thereform by a better develope bicipital area and more distally palced ectepicondylar prominence. Other taxa previously unrecorded from this site are listed:?Osteodontornis orri, Ciconiidae gen and sp. to be determined, Phoenicopteridae, Genus Megapaloelodus sp.

ADDITIONAL

A NEW SPECIES OF FULMAR (AVES:PROCELLARIIDAE) AND ADDITIONAL AVIAN RECORDS FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA

By Hildegarde Howard

The middle Miocene marine deposits of the Sharktooth Hill Bonebed in Kern County, California, were discussed in detail by Mitchell (1965). His listing of the fauna recovered from these beds (sharks, bony fishes, reptiles, birds and mammals) included the following birds:

Albatross--Diomedea californica Miller 1962

Shearwaters--Puffinus inceptor Wetmore 1930, P. priscus Miller 1961, P. mitchelli Miller 1961

Gannets--Morus vagagundus Wetmore 1930 and Morus sp. (Miller 1961)

Waterbirds--Presbychen abavus Wetmore 1930 and Branta sp. (Miller 1961)

Shorebirds -- Recurvirostra sp. (Miller 1961)

As collecting continued in the years following Mitchell's report, a second albatross, Diomedea milleri Howard 1966 and an osprey, Pandion homalopteron Warter 1976, were added.

The collections at the Natural History Museum of Los Angeles County now contain over 120 unrecorded avian speciemsn from Sharktooth Hill. Included among these are representatives of four taxa not noted in the above listing

Order Procellariiformes, Family Procellariidae

Genus Fulmarus, n. sp.

Order Pelecaniformes, Family Pelagornithidae

Genus and species ? Osteodontornis orri Howard 1957

Order Ciconiiformes, Family Ciconiidae

Genus and species to be determined

Order Charadriiformes, Family Phoenicopteridae

Genus Megapaloelodus A. Miller 1944

The present paper concerns the description of Fulmarus n. sp.

Among the avian fossil collected at Sharktooth Hill in 1979 was a small, fragmented humerus bearing similarities to those of the family Procellariidae. This family, which includes the fulmars, petrels and shearwaters, is, as noted above, ~~xexx~~ represented by three species of shearwaters, genus Puffinus. After expert preparation of the fragile humerus, it became eivdent that the specimen represents a species more closely allied to the fulmars than to the shearwaters. Although the living Fulmarus glacialis is recorded from the Pleistocene of California and Norway (Brodkorb 1963, p. 245),

The present paper concerns the description of Fulmarus n. sp. The material representing the other taxa are under study and will be presented at a later date.

ACRONYMSA USED

COMPARATIVW MATERIAL AVAILABLE

DESCRIPTION

DESCRIPTION

Among the avian fossils collected in 1979 from Sharktooth Hill was a small, fragmented humerus vearing similariteis to those of the family Procellariidae. This family, which includes the fulmars, petrels and shearwaters is well represented at Sharktooth Hill by three species of shearwaters, genus Pugginus. Aftr expert prepartion of the fragile humerus, it became evident that the specimen represents a species more closdy allied to the fulmars th to the shearwaters.

Although the living Fulmarus glacialis is recorded from the Pleistocene of California and Norway (Brodkorb 1963, p. 245), there are only two Tertairy records of the genus, both of Miocene age. Only one of these was described. The other, a fragment of humerus from Maryland was recorded as Fulmarus sp. (Wetmore 1926. Both were F. hammeri Howard 1968, from California represent of larger species size than the specimen from Sharktooth Hill.

The humerus (LACM 122995) from Shaktooth Hill is distinguished from this element in the shearwaters etc.

A NEW SPECIES OF FULMAR (AVES:PROCELLARIIDAE) FROM THE MIOCENE OF KERN COUNTY, CALIFORNIA.

By Hildegarde Howard

The middle Miocene marine deposits of the Sharktooth Hill Bonebed in Kern County, California, have been discussed in detail by Mitchell (1965). His listing of the fauna recovered from these beds (sharks, bony fishes, reptiles, birds and mammals) included the following birds:

- Diomedea californica Miller 1962 (Albatross)
- Puffinus inceptor Wetmore 1930 (Shearwater)
- P. priscus Miller 1961
- P. mitchelli Miller 1961
- P. sp. (cf. P. conradi) (Wetmore 1930)
- Morus vagabundus Wetmore 1930 (Gannet)
- Morus sp. (Miller 1961)
- Presbychen abavus Wetmore 1930 (goose)
- Branta sp. (goose (Miller 1961)
- Recurvirostra (Avocet) Miller 1961

Howard (1966) described another extinct species, Diomedea milleri, and noted 17 specimens in the collections of the Natural History Museum of Orange County (LACM) assignable to several of the previously described forms. Warter (1976) described an Osprey, Pandion homalopteron, bringing the total number of extinct species described from the Sharktooth Hill Bonebed to eight.

As collecting has continued at Sharktooth Hill, more than 120 avian specimens have been added to the LACM collection. This material is now under study. The present paper adds a ninth extinct species to the list of birds from Sharktooth Hill.

Among the fossils collected from the Bonebed in 1979 was a small, fragmentary humerus suggesting relationship to the Procellariidae, a family that includes the fulmars, petrels and shearwaters. As

Since that listing, a second species of albatross, Diomedea milleri Howard 1966, and an Osprey, Pandion homalopteron Warter 1976, have been described.

As collecting has continued at Sharktooth Hillmore than 120 avian specimens have been added to the LACM collection. This material is now under study. The family Sulidae, boobies and gannets, are most abundantly represented, with more than 60 bones from thirteen of the seventeen separate sites within the Bonebed. The shearwaters (Family Procellariidae) have 38 specimens from eight sites. and the albatrosses occur in eight sites with a total of 18 bones.

Each of these families is represented in other Miocene localities in southern California and a proper study of the Sharktooth Hill material will require careful analysis of the matieri from these localities.

There are, however, three aditional genera now to be added to two of which represent additional families in the the Bonebed fauna. These form the subject matter of the present paper.

A separate paper concerning the Family Anatidae and the species Presbychen abavus is inpreparation.

There are, however, three additional genera now tO be added to the Bonebed fauna, two of which represent additional families in the Bonebed fauna./These families, Phoenicopteridae (flamingos) and Pseudodontornithidae (Bony-toothed birds) is in preparation.

The present paper concerns an additional generic record fro the Family Procellariidae.

of Procellariidae were available for this study: Fulmarus glacialis (1), F. glacialoides (1), Thalassoica antarctica (1), Daption capense (1), Pagodroma nivea (1), Perodroma phaeopygia (1), Halobaena caerulea (1), Pachyptila vittata (1), Puffinus creatopus (2), P. pacificus (1), P. griseus (2), P. tenuirostris (1), and P. opisthomelas (1). All specimens of Fulmarus glacialis and of the several species of Puffinus are from the LACM collections, the other Recent material is from the USNM.

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by the deltoid crest having a prominent, projecting, hooklike point, bicipital crest longer and clerly delimited distally, ectepicondylar prominence short and blunt, olecranal fossa small, shaft above brachial depression broad laterally and shallow in palmar-anconal dimension.

In these characters resemblance is closest to the humerus in the fulmars, Fulmarus glacialis, F. glacialoides, Thalassioca antarctica, and the Cape Petrel Daption capense. T. antarctica and D. capense, however, have a marked depression below the head of the humerus which is not present in the two Recent species of Fulmarus or in the fossil at hand.

Of the representatives of the other fulmarine genera examined, the humeri of Pagodroma nivea and Halobaena caerulea are distinguished from the fossil by the presence of the depression below the head. Furthermore, in Halobaena caerulea, the ectepicondylar prominence is much wider. The humerus of Pachyptila vittata, also, is slightly excavated below the head, and the bicipital crest is shorter.

The humerus of the Dark-rumped Petrel, Pterodroma phaeopygia, has the prominently projecting deltoid crest, but distally, the shaft more closely resembles that of the Pink-footed Shearwater, Puffinis creatopus, and the ectepicondylar prominence is long and pointed as in the shearwters.

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by the deltoid crest having a prominent, projecting hooklike point, bicipital crest longer and clearly delimited distally, ectepicondylar prominence short and blunt, olecranal fossa small, shaft above brachial depression broad laterally and shallow in palmar-anconal dimension.

In these characters resemblance is closest to the humerus in Fulmarus glacialis, F. glacialoides, Thalassioca antarctica and and Daption capense. T. antarctica and D. capense, however, have a marked depression below the head of the humerus which is not present in Fulmarus or in the fossil now at hand.

The humerus of Pterodroma phaeopygia has the prominently projecting deltoid crest, but distally, the shaft more closely resembles that of Puffinus creatopus and the ectepicondylar prominence is long and pointed as in the shearwaters. Representatives of the other fulmarine genera examined, Pagodroma nivea and Halobaena caerulea are distinguished from the fossil by the marked depression below the head of the humerus. Furthermore, in Halobaena the ectepicondylar prominence is much wider, also, is slightly excavated below the head and the bicipital crest is shorter. The humerus of Pachyptila vittata

DESCRIPTION

The humerus (LACM 122995) from the Sharktooth Hill Bonebed is distinguished from this element in the shearwaters (genus Puffinus) by the prominently projecting, hooklike, point of the deltoid crest, longer bicipital crest more clearly delimited distally, ectepicondylar prominence short and blunt, and shaft above brachial depression broad laterally and shallow in palmar-anconal dimension.

In these characters resemblance is closest to the humerus in Fulmarus glacialis, F. glacialoides, Thalassioca antarctica and Daption capense. T. antarctica and Daption capense, however, have a marked depression below the head which is not present in Fulmarus or in the fossil now at hand. This depression is also observed in the humerus of Pagodroma nivea and Halobaena caerulea, and these forms a

as well as Pachyptila vittata also have a narrower deeper olecranal fossa than in LACM 122995. P. vittata is further distinguished by having a shorter, less distally defined bicipital crest. The humerus of Pterodroma phaopygia has the hooklike prominence of the deltoid crest and the clearly bordered bicipital crest, but distally the shaft more closely resembles that of Puffinus cretopus, and the ectepicondylar prominence is long and pointed as in the shearwaters.

Of the genera analyzed, the characters of the Fulmarus most closely resemble those of the Sharktooth Hill fossil. There are, however, slight differences, and, in view of the close similarity of Daption and Thallassioca to Fulmarus, it is possible that a distinct genus is represented. In view of the limited knowledge afforded by this single element, it is considered advisable, however, to record it under the genus Fulmarus.

Among the avian fossils collected in 1979 from the Miocene Sharktooth Hill Bonebed in Kern County California, was a small, fragmentary humerus suggesting relationship to the Procellariidae. This family is well represented in the Bonebed by three species of shearwaters, genus Puffinus. After expert preparation of the fragile humerus, it becomes evident that the specimen represents a species more closely allied to the fulmars than to the shearwaters.

There is only one Tertiary fulmarine record for Californnia. Fulmarus hajmeri Howard 1968 was described from a carpometacarpus

There is only one Tertiary fulmarine record for California, Fulmarus hammeri Howard 1968. This species was described from the Monterey Formation of Orange County, California with a proximal end of carpometacarpus as holotype and a distal fragment ofhumerus as referred. As the small size of the Sharktooth Hill specmen immediately distinguishes it from the referred humerus of F. hammeri, a new species is herein described.

Aong the avian fossils from Bonebed were several fragments of a small humerus, which when expertly prepared clearly plaxe it in the family Procellariidae. This family is well represented in the Miocene of California by several species of shearwaters, P. priscus, P. mitchelli and P. inceptor genus Puffinus, three of which are characteristic of the Sharktooth Hill Bonebed.

Although the characters of the Sharktooth Hill fossil most closely resemble those found in the genus Fulmarus, the differences noted are more marked than those that distinguish the two Recent species. In view of this fact and the close similarity of the humerus in Thallassioca and Daption to that of Fulmarus, it is possible that a distinct, perhaps ancestral, genus is represented by this single Miocene bone. In view of the limited knowledge now at hand, however, it is considered advisable to record this single specimen as a new species under the genus Fulmarus.

Fulmarus miocenus n. sp.

Holotype.-- Nearly complete left humerus, Natural History Museum of Los Angeles County no. 122995, collected by Howell W. Thomas in 1979.

Locality/-- LACM locality 3162, Sharktooth Hill Bonebed, Kern County, California.

Formation and Age.-- Round Mountain Silt, Middle Miocene, Barstovian Land Mammal Age.

Diagnosis.-- Deltoid crest with prominent, projected hooklike point as in Fulmarus glacialis and F. glacialoides, but distinguished from these species by shaft, anconally, below head less acutely angular, with capital shaft ridge more median in position and less proximal in extent. Bicipital crest relatively longer, more evenly rounded, and, viewed from palmar side, distal termination clearly marked and bicipital surface more swollen. Ectepicondylar prominence less raised above distal condyles (ratio of height of prominence above distal end to breadth of distal end 82 per cent as compared to 92-95 per cent in Fulmarus glacialis and 102 per cent in F. glacialoides). Actual height of ectepicondylar prominence above distal end 7.8 mm as compared to 13.0 mm in the fossil Fulmarus hammeri.

humerus (ratio of height of prominence above distal end of humerus to breadth of distal end 82 percent, as compared to 92-95 percent in F. glacialis and 102 percent in F. glacialoides). Distinguished from humerus of Miocene species F. hammeri, by smaller size (height of ectepicondylar prominence above distal end of humerus 7.8 mm, depth of external condyle 5.8 mm; same measurements in the humerus of F. hammeri 13.0 and 9.1 respectively).

Measurements.-- See Table 1.

Discussion.-- The Maryland record of Fulmarus sp. (Wetmore 1926) is based on a fragment of the shaft of a humerus (USNM 237160) between the nutrient foramen and the lower half of the pectoral scar. It was placed in the genus Fulmarus on the basis of the high elevation of the nutrient foramen and general simialrity and size with respect to the humerus of F. glacialis. The size alone, seemingly would preclude referral to F. miocaenus. Furthermore, according to Storrs Olsonof USNM, who examinedd the fragment for me, the specimen preserves no diagnostic features that could be used in comparison with the holotype of F. miocaenus, and should probably now be classified only as "Procellariidae, gen and sp. indet."

Storrs: The breadth and depth of the shaft in F. miocaenus are 5.0 and 4.0 mm. respectively, immediately below the tip of the deltoid crest. Would it be possible to take these measurements on USNM 237160?

If you approve of the above comparison with the USNM specimen, I will complete my page 5.

re F. hammeri -- The carpometacarpus (proximal end) was the holotype, but a distal fragment of the external side of humerus including condyle and ectepicondylar prominence was referred at the same time.

A NEW SPECIES OF FULMAR (AVES: PREVELLARIIDAE) AND ADDITIONAL AVIAN RECORDS FROM THE MIOCENE OF SHARKTOOTH HILL BONEBED, KERN COUNTY, CALIFORNIA

By Hildegarde Howard

INTRODUCTION

The middle Miocene marine deposits of the Sharktooth Hill Bonebed in Kern County, California were discussed in detail by Mitchell (1965). His listing of the fauna recovered from these beds (sharks, bony fishes, reptiles, birds and mammals) included the following birds:

Albatross -- Diomedea californica Miller 1962

Shearwaters -- Puffinus inceptor Wetmore 1930, P. priscus Miller 1961, P. mitchelli Miller 1961, and Puffinus sp. (cf. P. conradi) Wetmore 1930).

Gannets -- Morus vagabundus Wetmore 1930 and Morus sp. (Miller 1961)

Water birds -- Presbychen abavus Wetmore 1930 and Branta sp. (Miller 1961)

Shorebirds -- Recurvirostra sp. (Miller 1961).

Since Mitchell's report a second species of albatross, Diomedea milleri Howard 1966, and an osprey, Pandion homalopteron Warter 1976 have been described, and a number of additional specimens assignable to the previously described species have been recorded (Howard 1966 and 1978).

As collecting has continued at Sharktooth Hill, more than 130 avian specimens have been added to the collections of the Natural History Museum of Los Angeles County (LACM). These, together with casts of specimens collected by the University of California Museum of Paleontology (UCMP) not only provide numerous specimens of the previously recorded forms, but indicate the presence of four additional species, three of which represent families not heretofore recorded from the Bonebed.

Material

Throufh the kindness of Storrs L. Olson of the National Museum of Natural Hisotry, Smithsonian Institution, the following Humeri of Recent / The following/speice of the Family Procellariidae have been (8) available for this study: Puffinus opisthomelas, P. griseus (2), P. creatopus (2), P. pacificus (1); Fulmarus glacialis ( ), F. glacialoides (1); Daption capense (1); Thalassoica antarctica (1); Pterodroma phaeopygia (1); Halobaena caerulea (1); Pachyptila vittata (1); Pagodroma nivea (1). All specimens of Puffinus and those of Fulmarus glacialis are from the collections of the Natural History Museum of Los Angeles County (LACM) The other material was kindly loaned by the National Museum of Natural History, Smithsonian Institution. (USNM)

Other than the specimen under consideration from the Shaektooth Hill Bonebed, the only fossil specimens discussed are the holotype carpometacarpus (LACM 18262) and referred fragment of humerus (LACM 18263) of Fulmarus hammeri (

Methods

The Sharktooth Hill specimen (LACM 122995) was compared with humeri of the species noted above under "Material." Distinctions from the species of the genus Puffinus were immediately notable, as

Systematics

Ave
Description

The characters which distinguish LACM 122995 from humeri of /species of the genus Puffinus are: Deltoid crest long and having prominent projecting point; ectepicondylar prominence short and blunt.

Humerus LACM 122995 is distinguished from this element in the several species of the genus Puffinus by Deltoid crest having prominent projecting point; ectepicondylar prominence short and blunt.

Comparison with Recent genera related to the fulmars, namely Daption, Thalassoica, Halobaena, Pagodroma — shows some similarities as distinct from the Th Pteradroma, but the greatest similarity, however, lies with the Genus Fulmarus

Thalassoica antarctica Slender-billed Fulmar

Daption capense

May 6, 1981

Re: SUMMER CLASS SESSIONS

We have been informed that Saddleback College Emeritus Institute has experienced cutbacks for its summer program. Eileen Fitch's Creative Writing Class for the summer session was dropped.

Because many of us at last week's class session felt that we, as writers, need to experience continuity during the summer, and practice in our writing skills, we approached Eileen with a suggestion. She agreed to teach the class for eight sessions for what we offered her--$18.00 per hour for a 2 hour class from 1 to 3 P.M. on Wednesdays. The Institute has been paying the Lutheran Church $15.00 a day for use of their facilities. So we searched and found a bank, California Federal Savings and Loan, 24254 El Toro Rd., which can and will give us use of their community room for free.

Because of the short notice we received about our summer class cancellation, we had to pick eight dates in June and July on which class will be held. They are: June 3, 10, 17, and 24; July 1, 8, 15 and 22.

If we have a minimum of 20 people who can and will agree to pay $15.00 each for the eight class summer session, we can cover Eileen's salary at $18.00 per hour, $36.00 per 2 hour class session for eight Wednesdays. Twenty people will need to pay $15.00 either today or at our last class session on May 13th. If we have more or less than twenty people signing up, we will face that complication when it comes. Meanwhile, the first twenty people to sign the form below and give John Sharp their checks will be accepted in the summer session class. We will need to accept applicants in the order in which their money is received by John who will deposit it in a savings account in Eileen's name at California Federal Savings and Loan.

NOW TEAR THIS OFF HERE AND GIVE IT WITH CHECK TO JOHN SHARP

I agree to pay $15.00 for 8 summer sessions with Eileen Fitch to be held at California Federal Savings and Loan, 24254 El Toro Rd., from 1 - 3 P.M. on the following Wednesdays: June 3, 10, 17 and 24 and July 1, 8, 15 and 22.

I agree NOT to request a rebate for sessions I must miss. Attached is my check # _____, made out to Eileen Fitch, in the amount of $15.00.

Sign here: Name: _____

Address: _____

_____

Phone #: _____

These additional taxa are discussed herein

Order Procellariiformes, Family Procellariidae,

Genus Fulmarus, n. sp.

Order Pelecaniformes, Family Pelagornithidae
and species
Genus ?Osteodontornis orri

Order Ciconiiformes, Family Ciconiidae

Genus Ciconia sp.?

Order Charadriiformes, Family Phoenicopteridae

Genus Megalaoelodus, sp.?

Methods and Materials

The taxonomic order used herein follows for the most part the 1983 edition of the American Ornithologists Union Checklist of North American Birds. However, the falmingoes, Family Phoenicopteridae, are placed under the Order Charadriiformes in accord with studies by Olson and Feduccia (1980) on both fossil and Recent species of this group. Of the extinct families, the Family Pseudodontornithidae Lambrecht 1933 (bony-toothed birds) has been found to be a synonym for the Family Pelagornithidae Fürbringer 1888 (Olsom, in press).

Acronyms Used

LACM

USNM

NSM Nebraska State Museum

UCMP

Comparative Material

The albatrosses, shearwaters, gannets and geese are all well represented. There is no further occurrences of the avocet. In addition, the following previously unrecorded genera, representing three families heretofore unrecorded in the Bonebed, are now represented

The albatorsses, shearwaters, gannets and geese are wll well represented. Only the avocet shows no additional material. In addition, one new species and three genera, representing three families new to the Bonebed, have been found in the more recently collected material.

Family Procellariidae: Fulmarus, n.sp. (Fulmar)

Family Pseudodontornithidae: Osteodontornis ?orri (bony-toothed

Family Ciconiidae: Ciconia sp. (stork)

Family Palaeolodidae: Megapaloelodus sp: Falmingo

ORDER PROCELLARIIFORMES

Family Procellariidae

Genus Fulmarus

DISCUSSION. Among the avian fossils collected in 1979 from Sharktooth Hill was a fragile humerus bearing similarities to this element found in some members of the family Procellariidae. This family, which includes the fulmars, peltrel and shearwaters, is represented by three species of shearwaters, genus Puffinus, in the Sharktooth Hill Bonebed. After expert preparation of the fragile humerus, it became evident that the specimen represented a species more closely allied to the fulmars than to the shearwaters.

Although the living Fulmarus glacialis is recorded from the Pleistocene of California (Miller, 1914; Howard 1949), there is only one Tertiary fulmarine record for the state: Fulmarus hammeri Howard 1968, described from the Monterey Formation (late Miocene) of Orange County. The holotype of F. hammeri is the proximal end of a carpometacatpus (LACM), with a distal fragment of humerus (LACM) referred. The small size of the Sharktooth Hill specimen immediately distinguishes it from the humerus referred to F. hammeri.

DESXRIPTION

The humerus (LACM 122995) from the Snarktooth Hill Bonebed is distinguished from tjis element in the shearwaters (genus Puffinus) by the deltoid crest having a porminently projecting, hooklike point, the bicipital crest longer and clearly delimited distally, the ectepicondylar prominence short and blunt, the entepicondyle more rounded and less bladelike in its proximal extension anconally, and the shaft above the brachial depression broad laterally and shallow in its palmar-anconal dimension.

In these characters resemblance is closeest to the humerus of the fulmars, Fulmarus glacialis and F. glacialoides and the petrels Thalassoica

Although Fulmarus glacialis is recorded from the Pleistocene of of California, there is only one Tertiary record of the genus for the state, and only one other fulmarine there are only two former records for the Tertiary; F. hammeri Howard and Fulmarus sp. from the ?Miocene of Maryland (Wetmore 1926. The latter was on the basis of the shaft of a humerus said to resemble F. glacialis in "size and chatrucrure. It was was presumably too large to be attributable to F. from Sharktooth Hill.

Comparative Material

Modern: Humeri of the following Recent species of the Family Procellariidae: Puffinus opisthomelas (8), P. griseus (2), P. creatop us (2), P. pacificus (1): Fulmarus glacialis (7) (F. glacialoides (2); Daption capense (2); Thalassoica antarctica (2), Pterodroma phaeopygia (1), P. lessoni (1); Halobaena caerulea (2); Pachyptila vittata (2); Pagodroma nivea (2). Family Ciconiidae Ciconia alba, Euxenura maguari, Ephippiorhynchus, Mycteria americana, Phoenicopterus ruber

Modern Comparative material used is in the collections of the LACM, enhanced by additional humeri of the same species of Procellariidae loaned by USNM.

Fossil Comparative material: Casts of holotype of Megapaloelodus connectens (tarsometatarsus UCMP 37367), and referred coracoid UCMP 2346 from the Barstow Miocene; Cast of type of Osteodontornis orri SBMNH 309 Referred ./Ulnae and tibiotarsi of Ciconia maltha Miller from Rancho La Brea LACM; and ulnae and tibiotarsi of Jabiru mycteria Lichtenstein from the Pleistocene tar seps of Talara Peru, Royal Ont. Mus. Toronto Canada.

Acronyms U sed

LACM Natural History Museum of Los Angeles County
UCMP University of Californa Museum of Paleontology
USNM United States Natioanl Museum, Smithsonian Unstitution
ROM Royal Ontario Museum, Toronta, Canada
SBMNH Santa Barbara Museum of Natural History
NSM Nebraska State Museum

Materials

Modern comparative material used is in the collections of the

Acronyms used: LACM Natural History MOuseum of Los Angeles County

UCMP University of California, Museum of Paleontology

USNM National Museum of Natural History, Smith. Ins

Comparative Material used: The modern comparative material used is in the collections of LACM with the exception of the following Procellariid humeri loaned by USMP: Fulmarus glacialoides (1), Daption capense (1), Thalassoica antarctica Pterodroma phaeopygia (1): Halobaena caerulea (1), Pachyptila vittat (1), and Pagodroma nivea (1).

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The additional taxa, which are discussed herein, are as follows:

taxian taxa:

Order Procellariiformes, Family Procellariidae, Genus Fulmarus, new species.

Order Ciconiidormes, Family Ciconiidae, genus and species ?

Order Charadriiformes, Family Phoenicopteridae, Genus Megapaloelodus, sp.?

Order Pelecajiformes, Family Pelagornithidae, Genus and species ?Osteodontornis orri.

Methods and materials.

The taxonimic order used herein follows for the most part the 1983 edition of the American Ornithologists Ujion Checklist of North American Birds. However, the flamingoes, Family Phoenicopteridae, are placed under the Order Charadriiformes in accord with studies by Olson and Feduccia (1980) on both fossil and Recent species of this group. Of the extinct families, the Family Psdudodontornithidae Lambrech 1933 ("bony-toothed birds", Family Pelargornithidae Furbringer 1888, (Olson, in press).

Modern Comparative material used is in the collections of the Los Angeles County (LACM) Natural Hisotory Museum of with the exception of certain Procellariid humeri loaned by the United States National Museum of Natural Hisotry (see description of Fulmarus, new species. Fossil material includes casts of specimens in the UCMP collection.

Acronyms used: LACM Natural History Museum of Los Angeles County

UCMP Unive tsity of California Museum of Paleontology

USNM NationalMuseum of Natural History, Smith. Inst.

Compared fossil material holotype (CAST?) Megapaloelodus connectens (tarsometatarsus 37347 UCMP); referable holotype (?) right complete coracoid M. connectens UCMP 23342 from Barstow, referred tarso. M. ofpisonus from Cedar Island LACM 15423

TO: Leisure World News
FOR RELEASE: Thursday, March 1
FROM: Soroptimist Club of Leisure World, Laguna Hills
Hildegarde Wylde Publicity Chairman 830-2486

Eleven members of the Downey Soroptimist Club attended the Leisure World Soroptimist meeting on Monday, February 20 in honor of Mabel Showalter and Dora Swalla. These two sisters are Life Members of the Downey Club, and were active there for years before coming to Leisure World.

Not long after their arrival in Leisure World, they set out to organize a Soroptimist Club for Leisure World. When the Club was finally organized, in February, 1967, Mabel Showalter was elected as first President, and the Downey Soroptimist Club provided the money for the plaque to be placed outside Clubhouse I.

Description

Humerus LACM 122995 is distinguisned from this element in the several species of the genus Puffinus byi: Deltoid crest having a prominent projecting point; ectepicondylar prominence short and blunt, shaft above brachial depression broad laterally and shallow in palmar-anconal dimension. bicipital crest longer

Of those genera in which the deltoid crest has a pointed prominence, ~~LACM 122995 is distinguished from~~, Pterodroma phaeopygia has a longer ectepicondylar prominence compared

Of the several genera in which this combination of characters os observed, namely Fulmarus, Daption, Thalassoica, Halobaena, Pachyptila and Pagodroma, the fossil LACM 122995 most closely resembles the two ~~species~~ species of the genus Fulmarus It is also distinguished from Pterodroma phaeopygia by the shorter more blunt ectepicondylar prominence ~~and~~ as well as by a clearly marked capital shaft ridge

Of the several genera compared, the in which this combination of characters is observed (Fulmarus, Daption, Thalassoica, Halobaena, Pachyptila and Pagodroma), the fossil most closely resembles a two species of the genus Fulmarus in presence of a clearly marked capital shaft ridge, no depression below the head anconally, and olecranol fossa broad and shallow. Although

Of the several genera compared, which have the ~~prominence~~ pointed prominence of the deltoid crest (Fulmarus, Daption, Thalassoica, Halobaena, Pachyptila, Pagodroma and Pterodroma), the fossil most closely resembles the two species of the genus Fulmarus in the presence of a clearly marked capital shaft ridge, no depression below the head anconally and the olecranol fossa broad and shallow. ~~Pterodroma, Halobaena and Pachyptila~~ In Pagodroma, Daption and Thalassoica the captil shaft ridge is present but the area below the head is markedly depressed, distally, both Pagodroma and Thalassoica ~~are~~ have a ~~more~~ narrower, ~~more~~ deeper olecranal fossa. The fossil is, therefore, referred to the genus Fulmarus.

SYSTEMATICS

CLASS AVES Linnaeus 1758

Order CHARADRIIFORMES (Huxley 1867)

Family ALCIDAE Vigors 1825

Subfamily ALCINAE (Vigors 1825)

Genus URIA Brisson 1760

In the fossil specimen from Lompoc, as exposed on the diatomite slabs and shown in the latex molds, cetain characters shared with Uria, Alca Linnaeus 1758 and Pinguinus Bonnaterre 1790 (genera which Storer, 1960, groups together in the tribe Alcini) are observable: sharply ridged temporal fossa of the cranium, long process of metacarpal I of the carpometacarpus, and depressed, ovoid pectoral attachment of the humerus, with the external tuberosity projecting anconally.

The straight beak and well developed wing elements immediately distinguish the fossil specimen from the flightless Great Auk, genus Pinguinus. The straight beak also distinguishes the fossil from the Razorbill, genus Alca. Other distinctions from Alca include the more rounded shaft of the humerus and less acute bend in the anconal profile of its distal end, and a narrower coraco-sternal connection. In all of these characters, as well as the general proportions of the skeleton, the fossil resembles the murres, genus Uria.

Uria brodkorbi, new species

Figures 1 through 4

HOLOTYPE: PB7960, consisting of impressions of skull and anterior portion of skeleton on two slabs of diatomite. Slab PB7960A contains the skull in lateral aspect, and seven cervical